



Fitness and Footwear

A Case for the Minimalist

By Hugh Cox, Navy and Marine Corps Public Health Center Public Affairs

The latest trend in exercise shoes, currently lining the shelves of most athletic footwear retailers and still being evaluated by fitness experts, is the barefoot or "minimalist" style. These types of shoes have continued to enjoy double-digit sales growth since the start of 2010 and have outsold nearly every other type of shoe during that time.

Minimal footwear is designed to allow the foot to function naturally without providing additional support or cushion. The amount of cushioning available largely depends upon the preferences of the manufacturer.

In August 2011, the Navy officially announced approval for Sailors to wear minimalist footwear with the Navy physical training uniform during command or unit physical training, individual physical training and the semi-annual physical readiness test. NAVADMIN 238/11 defines minimalist footwear as shoes that allow the foot to function naturally without providing additional support or cushioning.

It's important to note that this approval does not constitute an official endorsement by the Navy.

Evaluations by various organizations have taken place to determine the efficacy and safety of minimalist footwear. The Navy and Marine Corps Public Health Center (NMCPHC) and Center for Personal and Professional Development (CPPD) recently conducted a comprehensive literature review and professional interviews with recognized industry experts.

As part of the evaluation process, data was used from national running biomechanics laboratories, such as the Harvard University Skeletal Biology Lab, University of Delaware Davis Motion Analysis Laboratory, and the University of Delaware Running Injury Clinic.

In traditional running shoes, approximately 75 percent of American runners have been shown to heel-strike, which causes a very large and sudden force about 1000 times per mile run. By landing on the middle or front of the foot, the impact force is reduced considerably. The impact force reduces the impact force to 60 percent of one's bodyweight, much less than most "traditional running shoe" runners generate when they heel-strike.

"Barefoot runners don't land on their heels because it hurts - which is, in my opinion, a compelling argument for the notion that we were not designed to run on our heels," said Dr. Irene Davis, director for the Spaulding Running Center Department of Physical Medicine and Rehabilitation Harvard Medical School Spaulding-Cambridge Outpatient Center, Cambridge, Mass.

According to Dr. Davis, the cushioning of running shoes makes it more comfortable to land on the heels. However, you pay for this landing with an impact transient that increases injury risk.

"Our research has identified a relationship between impact loading and running injuries in heel-strike runners," said Davis. "As a result, we have engaged in studies aimed at reducing these impacts through gait retraining in heel-strike runners."

According to Ms. Diana Strock, Navy and Marine Corps Public Health Center (NMPHC) program manager for physical fitness and injury prevention and manager, human performance and public health, at the Navy's Center for Personal and Professional Development, there is still much more research that needs to be conducted on minimalist footwear as it relates to running and injury prevention.

"Just because you put minimalist—barefoot style footwear on your feet doesn't mean you will automatically begin running with the correct running form," said Strock.

Many individuals who use minimalist footwear for running do not change their style of running to a midfoot or forefoot strike pattern. It's not easy to re-learn to run, said Strock.

These heel-strike runners using minimalist footwear have a greater impact



◀◀ Though minimalist footwear is not recommended for basketball or similar impact sports due to minimal protection and support, there could be benefits during warm-up/movement preparation exercises, strength training, or regeneration training.

(MC2 Rafael Martie/USN)

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force than if they ran in "traditional style" running shoes that have been on the market since the 1970's. There is concern when Sailors use the minimalist footwear for running and continue to use a rear-foot heel-strike pattern --- they experience a higher rate of loading/impact on the body.

"When utilizing minimalist footwear, your body also needs time to acclimate and adapt," said Strock. "Ease into it. Your body takes a while to adapt to a new running style. The change in training requires an adjustment period to allow the body to gradually adapt to different stresses just as with any new exercise program."

According to Strock, if Sailors are wearing minimalist footwear for running and they begin to feel their heel strike the ground during a run, this is not good. When this occurs and they would like to continue a cardiovascular workout, they could combine their workout with another type of Energy Systems Demand (ESD) exercise that requires less impact, like cycling, elliptical training, Versa-climbing, etc., until the body adapts to running using midfoot/forefoot form. When performing any exercise, execution is most important to obtain desired results and should never be performed without proper form and technique.

Historically, humans have engaged in running, presumably safely, for thousands of years. Throughout this time frame, humans were either barefoot or wore little more than "minimalist" footwear such as

sandals or moccasins with smaller heels and little cushioning. So it seems that the current "trend" in running, at least for a portion of the "running populous," is a return to the earliest days of running through use of minimalist footwear.

"It is important to make the distinction that barefoot and minimalist footwear are for walking and running, not playing impact sports like tennis and basketball or working on a construction site," said Capt. Scott Pyne, the Surgeon General's Specialty Advisor for Sports Medicine, Navy Bureau of Medicine and Surgery, and member of the Navy's Musculoskeletal Advisory Board.

However, use of minimalist footwear during warm-up/movement preparation exercises, strength training, or regeneration training could be beneficial.

"For the performance of non-running physical training activities like strength training or movement preparation or regeneration training, the minimalist shoe provides greater sensory input with less between the foot and the ground. This yields improved balance and movement efficiency during the workout," said Strock.

For Sailors considering the transition from traditional to minimalist footwear, there are a few documented pros and cons to consider.

The pros include lack of arch support results in strengthening of the arch musculature (a stronger foot is a healthier foot and more resistant to injury). Lack

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(MC2 Stacy D. Laseter/USN)

of wide heel reduces excessive pronation at foot strike during running. Runners experience greater sensory input with less between the foot and the ground. Without cushioning, the runner lands softer—less stiff and lands on the mid-foot/forefoot, significantly reducing the impact peak and reducing the risk for injury.

The cons and safety concerns include less overall support of the foot, requiring greater demand of the foot and lower leg muscles—increasing the risk of injury of these structures if not adequately trained and less overall protection for the foot. This shoe is not recommended for anyone with pre-existing foot problems or anyone that is successfully utilizing foot orthotics.

From the Navy's perspective, more research needs to be completed before experts and decision-makers would consider an endorsement of minimalist footwear. The decision to use minimalist footwear is a personal one and Sailors are reminded to carefully consider all the available data before making the switch. **SW**